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Jae Mo Shin*, CRG, Cresskill, NJ, NJ , and **Richard Kyung**, CRG, Cresskill, NJ. *Study on the Calculus of Variations and Lagrange multipliers to Solve Isoperimetric Problems.*

In this paper, Lagrange multipliers and a few theorems were stated to prove the isoperimetric inequality.

The idea of Lagrange multipliers can be used to maximize or minimize a certain function under a constraint assuming that such extrema exist. The theorem of Lagrange multipliers is the main method that we discussed throughout this paper. Also we stated how the theorem was applicable to specific example.

Fundamental Lemma of the Calculus of Variations and Euler Lagrange equation were explained, thereafter the isoperimetric inequality in 3D case under certain restrictions was stated. The surface area of a surface of revolution was considered and the volume was calculated. The final solution of derived differential equation was found to be a sphere after the rotation. (Received September 05, 2018)